

OPTICAL PHENOMENA.

HALOS.

The following are brief descriptions of the weather conditions attending or succeeding the occurrence of the most extensively observed halos of the month:

1st.—Both solar and lunar halos were reported from numerous stations in the Missouri Valley, upper Mississippi valley, and upper lake region, with lunar halos, only, in New England. They were followed on the 2d by lower pressure, and in New England by a heavy snow storm with high winds.

2d.—Lunar halos were observed at a large number, and solar halos, at a few stations in the Mississippi and Missouri valleys, Arizona, and California; they were accompanied in the valley districts by cirro-stratus clouds with haze, and followed on the 3d by rapidly falling pressure and cloudy weather.

3d-6th.—On the 3d rain or snow fell over the greater part of the northeastern quarter of the country, with clear or fair weather in all other sections; the area of cloudiness was surrounded on all sides by a strip of country in which halos appeared. They were also reported from stations in California, Arizona, and southern Texas. The 4th, 5th, and 6th were similar to the 3d, the area of cloudiness being surrounded by stations reporting halos.

7-8th.—Haze and cirro-stratus clouds partially covered the sky in the northern sections and were accompanied by solar and lunar halos with high, rising pressure. On the 8th the maximum pressure of the month in these districts occurred, and a number of stations reported halos.

9-30th.—From the 9th to 26th solar halos were noted at widely separated stations, and not generally in any district. The storm of the 27th, 28th, and 29th was preceded and followed over the central and eastern sections of the United States by solar and lunar halos which were reported from a large number of stations. On the night of April 30th and May 1st an area of heavy stratus clouds covered northern New England, the lower lake region, and the northern plateau and slope of the Rocky Mountains, in other districts light haze or fair weather prevailed, and the majority of the stations in the Mississippi Valley and eastern districts, except where the sky was entirely covered, reported lunar halos.

The phases of the moon, Washington mean time, during April, as given in "The American Ephemeris and Nautical Almanac" for 1887, are as follows: New moon, 22d, 15 h. 45.0 m.; first quarter, 30th, 5 h. 52.1 m.; full moon, 7th, 12 h. 30.8 m.; last quarter, 14th, 10 h. 55.6 m.; perigee, 6th, 18.6 h.; apogee, 19th, 9.4 h.

MIRAGE.

Mirages were observed at the following places:

California.—San Francisco, 24th.

Dakota.—Parkston, 1st, 2d, 5th, 6th, 12th, 18th, 25th; Webster, 16th, 18th, 20th, 25th.

Kansas.—Salina, 2d, 6th, 7th, 23d, 29th.

New York.—Palmyra, 12th.

North Carolina.—Reidsville, 17th.

Illinois.—Lake Forest, 2d.

MISCELLANEOUS PHENOMENA.

FOREST AND PRAIRIE FIRES.

Huron, Dak.: on the morning of the 8th prairie fires were seen toward the north and south. A steady gale from the south and southeast prevailed throughout the day, attaining for twenty minutes between 6 and 7 p. m. a velocity of forty-eight miles per hour. The observer states that during this gale the fires were driven with incredible speed, and great masses of burning grass were blown miles ahead of the main body of flame; ordinary fire breaks or guards were useless. The heat was felt two and a half miles in advance of the flames. Much property was burned, and several lives were lost. Eighteen miles west of Sioux Falls a fire started and swept over miles of prairie, burning several farm houses, with barns, stock, and machinery. Several other large areas of country in the southeastern part of Dakota were burned over during the prevalence of this gale.

Valentine, Nebr.: on the 6th, 7th, and 8th prairie fires could be seen in all directions; these fires did great damage to settlers, many of whom lost all they possessed.

Atchison, Kans.: on the 11th a prairie fire started near Nicodemus, Graham Co., and moved rapidly toward the northwest before a high wind which was blowing at the time, burning a path two and a half to seven miles in width and about sixty miles in length. It is reported that large numbers of stock of all kinds were burned, and thousands of tons of hay, corn, wheat, as well as dwelling houses and barns, were destroyed by the flames. Large areas of land in Sheridan, Gove, and other counties in northwestern Kansas, and in Furnas county, Nebr., were burned over.

Forest or prairie fires occurred also at the following places: North Platte, Nebr., prairie fires, 1st, 2d, 7th, 28th; Yankton, Dak., prairie fires, 1st, 17th to 20th, 23d, 24th, 25th; Fort Reno, Ind. T., prairie fires, 3d; Fort Supply, Ind. T., prairie fires, 4th; Concordia, Kans., prairie fires, 4th, 28th; Stateburg, S. C., forest fires in various directions, 5th, 12th; Moorhead, Minn., prairie fires, 6th, 8th, 15th to 18th, 29th; Bismarck, Dak., prairie fires, 19th, 29th; Poplar River, Mont., prairie fires, 26th, 27th; Fort Buford, Dak., 29th.

METEORS.

Meteors were reported as follows:

Yuma, Ariz., 1st; Fort Grant, Ariz., and Delavan, Wis., 18th; Willcox, Ariz., and Dover, N. J., 19th; New Haven Conn., 20th; Manatee, Fla., 12th, 17th; Sanford, Fla., 15th; Archer, Fla., 20th; Windsor, Ill., 14th, 22d; Charleston, Ill., 22d; Midway, Ky., 10th; Woodstock, Md., 13th; Cambridge, Mass., 8th; Kalamazoo, Mich., 1st, 2d, 10th; Raleigh, N. C., 24th; Stateburg, S. C., and University of Va., 11th; Rappahannock, Va., 9th; La Crosse, Wis., 21st, 25th.

MIGRATION OF BIRDS.

Geese flying northward.—Wakefield and Manhattan, Kans., 1st; Bismarck, Dak., 1st, 4th; Poplar River, Mont., 1st, 5th, 6th, 7th; Fort Meade, Dak., and Dubuque, Iowa, 2d; Moorhead, Minn., 2d, 9th; Kitty Hawk, N. C., 4th; Fall River, Mass., 5th; Albany, Oregon, 6th, 7th, 10th, 12th, 13th, 16th to 19th, 23d to 27th; Readington, N. J., and Oswego, N. Y., 7th; Embarras, Wis., 11th; East Portland, Oregon, 12th, 26th; Charleston, Ill., and Fort Assinaboine, Mont., 13th; Archer, Fla., and Mackinaw City, Mich., 14th; Saint Vincent, Minn., 14th, 19th, 20th, 25th; Traverse City, Mich., 15th; Astoria, Oregon, 16th, 18th, 19th; Hay Springs, Nebr., and Bird's Nest, Va., 18th; Linkville, Oregon, 25th, 26th, 27th; Grand Haven, Mich., and Fort Bidwell, Cal., 26th; Fort Custer, Mont., 28th; Tatoosh Island, Wash., ducks and geese flying towards the north in great numbers nearly every day of the month.

Geese flying southward.—East Portland, Oregon, 4th.

Geese flying westward.—Kalamazoo, Mich., 3d; Yuma, Ariz., 10th.

Ducks flying northward.—Moorhead, Minn., 2d; Kitty Hawk, N. C., 4th; La Crosse, Wis., 9th; Saint Vincent, Minn., 19th.

Ducks flying southward.—Grand Haven, Mich., 2d; Saint Vincent, Minn., 9th.

Cranes flying northward.—Brownville, Nebr., 1st.

POLAR BANDS.

Polar bands were reported from the following stations:

North Colebrook, Conn., 9th; Archer, Fla., 4th, 15th, 17th,